

Appln No. 10/728,970
Amdt. Dated November 23, 2005
Response to Office Action of October 28, 2005

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Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Original) An ink jet printhead comprising:
a plurality of nozzles;
a chamber corresponding to each of the nozzles respectively, the chambers adapted to contain an ejectable liquid; and,
at least one droplet ejection actuator associated with each of the chambers respectively, the droplet ejection actuator being adapted to eject a droplet of the ejectable liquid from the nozzle; wherein,
the chamber is at least partially formed by an amorphous ceramic material.
2. (Original) An ink jet printhead according to claim 1 wherein the drop ejection actuator is a heater element configured for thermal contact with a bubble forming liquid within the chamber; such that,
heating the heater element to a temperature above the boiling point of the bubble forming liquid forms a gas bubble that causes the ejection of a droplet of the ejectable liquid through the nozzle corresponding to that heater element.
3. (Original) An ink jet printhead according to claim 1 wherein the amorphous ceramic material is silicon nitride.
4. (Original) An ink jet printhead according to claim 1 wherein the amorphous ceramic material is silicon dioxide.
5. (Original) An ink jet printhead according to claim 1 wherein the amorphous ceramic material is silicon oxynitride.
6. (Original) An ink jet printhead according to claim 2 wherein the ejectable liquid is the same as the bubble forming liquid.
- 7 (Original) An ink jet printhead according to claim 1 wherein the printhead is a pagewidth printhead.

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8. (Withdrawn) An ink jet printhead according to claim 1 wherein the droplet ejection actuator is a paddle vane located within the chamber, the paddle vane being adapted to be actuated by a thermal actuator for ejecting a droplet of the ejectable liquid;

a thermal actuator located externally of the chamber and attached to the paddle vane, wherein the thermal actuator includes a plurality of separate spaced apart elongate thermal actuator units, which are interconnected at a first end to a substrate and at a second end to a rigid strut member.

9. (Withdrawn) An ink jet printhead as claimed in claim 8 wherein the rigid strut member is connected to a lever arm having one end attached to the paddle vane.

10. (Withdrawn) An ink jet printhead as claimed in claim 1 wherein the thermal actuator units operate upon conductive heating along a conductive trace, the conductive heating including generation of a substantial portion of the heat in an area adjacent the first end of each thermal actuator unit.

11. (Withdrawn) An ink jet printhead as claimed in claim 4 wherein said conductive heating includes a thinned cross-section adjacent said first end.

12. (Withdrawn) An ink jet printhead as claimed in claim 1 wherein the thermal actuator units comprise conductive heating layers which, in turn, comprise substantially either a copper nickel alloy or titanium nitride.

13. (Original) A printer system which incorporates a printhead, the printhead comprising:

a plurality of nozzles;

a bubble forming chamber corresponding to each of the nozzles respectively, the bubble forming chambers adapted to contain a bubble forming liquid; and,

at least one heater element disposed in each of the bubble forming chambers respectively, the heater elements configured for thermal contact with the bubble forming liquid; such that,

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heating the heater element to a temperature above the boiling point of the bubble forming liquid forms a gas bubble that causes the ejection of a drop of an ejectable liquid through the nozzle corresponding to that heater element; wherein, the bubble forming chamber is at least partially formed by an amorphous ceramic material.

14. (Original) A printer system according to claim 13 wherein the drop ejection actuator is a heater element configured for thermal contact with a bubble forming liquid within the chamber; such that, heating the heater element to a temperature above the boiling point of the bubble forming liquid forms a gas bubble that causes the ejection of a droplet of the ejectable liquid through the nozzle corresponding to that heater element.
15. (Original) A printer system according to claim 13 wherein the amorphous ceramic material is silicon nitride.
16. (Original) A printer system according to claim 13 wherein the amorphous ceramic material is silicon dioxide.
17. (Original) A printer system according to claim 13 wherein the amorphous ceramic material is silicon oxynitride.
18. (Original) A printer system according to claim 14 wherein the ejectable liquid is the same as the bubble forming liquid.
19. (Original) A printer system according to claim 13 wherein the printhead is a pagewidth printhead.
20. (Withdrawn) A printer system according to claim 13 wherein the droplet ejection actuator is a paddle vane located within the chamber, the paddle vane being adapted to be actuated by a thermal actuator for ejecting a droplet of the ejectable liquid;
a thermal actuator located externally of the chamber and attached to the paddle vane, wherein the thermal actuator includes a plurality of separate spaced apart elongate thermal actuator units, which are interconnected at a first end to a substrate and at a second end to a rigid strut member.

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21. (Withdrawn) A printer system as claimed in claim 20 wherein the rigid strut member is connected to a lever arm having one end attached to the paddle vane.

22. (Withdrawn) A printer system as claimed in claim 13 wherein the thermal actuator units operate upon conductive heating along a conductive trace, the conductive heating including generation of a substantial portion of the heat in an area adjacent the first end of each thermal actuator unit.

23. (Withdrawn) A printer system as claimed in claim 16 wherein said conductive heating includes a thinned cross-section adjacent said first end.

24. (Withdrawn) A printer system as claimed in claim 13 wherein the thermal actuator units comprise conductive heating layers which, in turn, comprise substantially either a copper nickel alloy or titanium nitride.

25. (Original) A method of ejecting drops of an ejectable liquid from a printhead, the printhead comprising a plurality of nozzles;
a chamber corresponding to each of the nozzles respectively, the chambers adapted to contain an ejectable liquid; and,
at least one droplet ejection actuator associated with each of the chambers respectively;
wherein,
the chamber is at least partially formed by an amorphous ceramic material;
the method comprising the steps of:
placing the ejectable liquid into contact with the drop ejection actuator; and
actuating the droplet ejection actuator such that a droplet of an ejectable liquid is ejected through the corresponding nozzle.

276. (Currently Amended) A method according to claim 25 wherein the drop ejection actuator is a heater element configured for thermal contact with a bubble forming liquid within the chamber; such that, heating the heater element to a temperature above the boiling point of the bubble forming liquid forms a gas bubble that causes the ejection of a droplet of the ejectable liquid through the nozzle corresponding to that heater element.

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287. (Currently Amended) A method according to claim 25 wherein the amorphous ceramic material is silicon nitride.

298. (Currently Amended) A method according to claim 25 wherein the amorphous ceramic material is silicon dioxide.

3029. (Currently Amended) A method according to claim 25 wherein the amorphous ceramic material is silicon oxynitride.

3130. (Currently Amended) A method according to claim 26 wherein the ejectable liquid is the same as the bubble forming liquid.

321. (Currently Amended) A method according to claim 25 wherein the printhead is a pagewidth printhead.

33. (Withdrawn) A method according to claim 25 wherein the droplet ejection actuator is a paddle vane located within the chamber, the paddle vane being adapted to be actuated by a thermal actuator for ejecting a droplet of the ejectable liquid;

a thermal actuator located externally of the chamber and attached to the paddle vane, wherein the thermal actuator includes a plurality of separate spaced apart elongate thermal actuator units, which are interconnected at a first end to a substrate and at a second end to a rigid strut member.

34. (Withdrawn) A method as claimed in claim 33 wherein the rigid strut member is connected to a lever arm having one end attached to the paddle vane.

35. (Withdrawn) A method as claimed in claim 25 wherein the thermal actuator units operate upon conductive heating along a conductive trace, the conductive heating including generation of a substantial portion of the heat in an area adjacent the first end of each thermal actuator unit.

36. (Withdrawn) A method as claimed in claim 29 wherein said conductive heating includes a thinned cross-section adjacent said first end.

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37. (Withdrawn) A method as claimed in claim 25 wherein the thermal actuator units comprise conductive heating layers which, in turn, comprise substantially either a copper nickel alloy or titanium nitride.